Telephony

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In the Nation's Capital

By FRANCIS X. WELCH

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TODAY'S IMPORTANCE of trade associations has not been paralleled since the medieval guilds . . . Many problems concerning industry require the constant attention in Washington of association representatives . . . The Berle report on competition and regulation contains some interesting personal ideas

IF THE WAGES and hours bill does nothing else it should bring home to all industries and to the Independent telephone industry in particular, the value—indeed, the present-day necessity—for the trade association.

The widespread Bell System has its parent concern to look after the destinies and welfare of its smallest unit, but with the Independents the swift complexities of modern business are making industrial union the price of survival. They find themselves in about the same position as Benjamin Franklin when he told John Hancock in 1776, "We must all hang together or assuredly we shall all hang separately."

THE TRADE association of today is assuming an importance to business which has not been paralleled since the medieval guilds. The trade association is to business what the labor union is to labor—it is the business man's spokesman, his collective bargaining agent. In any conflict between employer and employe, under the present labor relation laws, there is no doubt that the individual employer is at a decidedly unfair disadvantage without the assistance of the trade association.

In the frequent clashes between employer and government (over taxes, regulation, new legislation, or what not) the small business man, who tries to go it alone without help of his industrial association, is just the fat boy of American politics, a sucker, a set-up, and a pushover.

This is said not to help along any national or state association membership drive (if, indeed, any are under way). It is simply an observation based upon close range study of what is happening to business in Washington today. We have got to face the facts. Labor is organized. Government is organized. Therefore, industry must organize if its interests are to be protected at all. There is no choice. The new wage and hour act merely marks the latest and most imminent stage in the evolution of the trade association towards its position of predominance.

The new law provides for administration by industrial committees upon which there must be representatives of industry. How would the average industry agree upon a true representative without the organization of a trade body? The answer is that it probably would not agree. There might develop a scrap. And while the rumpus is going on, either Labor or Government might get some good friends of their own to "represent" the industry on the committee. That happened before under the old NRA.

For that matter, there are grave doubts as to whether any attempt will even be made to apply the new wages and hours act to the Independent telephone industry; but when exemption comes, you may depend upon it, it will come chiefly through the untiring efforts of the Washington representatives of the national association of Independent telephone companies. Washington is not handing out exemptions from Federal laws without somebody asking for it—and asking often and loud.

But aside from the Federal wage-hour act, there are the state wage-hour laws which are already being cut by the progressives to the same Federal pattern. Here is where the state associations will be indispensable in obtaining possible exemptions or easing the burdens of compliance. And if the Federal wage-hour act ever should be applied to the local Independent telephone companies, upon the state associations of the industry would fall the bulk of responsibility for assembling data, and making clear the position of the member companies to the powers that be in Washington.

ALL IN ALL, the average industrial trade association has come a long way since the sleepy pre-war days, when its principal function was only too often the holding of an annual convention to let the big-wigs blow off steam and the little wigs cut capers away from home. During the war, the more important (certainly the more useful) trade associations realized their importance as a central clearing house for technical and statistical information, as a common meeting place to settle competitive differences and agree upon trade practices and ethics.

The NRA raised the trade associations to a new dignity by making them virtually responsible for industrial participation in the various code authorities. Today, the wages and hours act is only one important phase of the representative work which the various industrial associations must perform for their membership here in Washington, or in their state or regional subdivisions.

There is the matter of taxation, to name another important phase, and numerous other problems varying with the character of the industry. With the telephone industry, of course, the national association's Washington agent must keep in constant touch with the work of the FCC, REA, and Federal courts.

WHERE is it all leading—this continued and necessary increase in the importance of the trade association? Some serious students of political economy feel that we are completing a cycle in this matter. "We are coming back to a sort of guild system," writes Jerome Frank, assistant secretary of the Treasury, in his recently published book, "Save America First." He points out that in Europe, as early as 1250, craft guilds reached a point of development which might be compared with the various industrial trusts in the modern Soviet government set-up, or the various industrial cartels of the Fascist corporate state of Italy.

That really is a thought-provoking prediction, because in both Russia and Italy, theoretically, the composite will of the board of directors of the various industrial cartels is superior to all but the highest authority of the state. They make their own laws, their own prices, and even control the conduct of the employes.

Mr. Frank doesn't mean, of course, that our industrial "guilds" will grow so powerful as to supersede the law-making authority of our legislatures—that couldn't happen in a democracy. But he does visualize the ascendency of trade groups to positions comparable with the code authority of NRA. Nor should this vision of the increasing importance of the industrial group, as a group, cause Independent telephone men to worry about their continued independence.

Assistant Secretary of State Adolph A. Berle said some very pertinent things about that in a so-called confidential memorandum submitted last week to the Congressional Monopoly Investigating Committee. Mr. Berle denies that small business is necessarily competitive and questions whether the textile industry, which is highly competitive, enjoys a better position than the steel industry. He said it was quite possible that some of the village groceries were monopolies until they felt the competition of the chain stores.

AND LEAVING the subject of trade associations and their present and future importance, this memorandum of Brain Truster Berle contained quite a number of other interesting personal ideas—some of which seem to be quite at variance with the prevailing views of the administration. For example, he says that in some fields where unbridled competition is destructive and where we are not prepared either for monopoly or public ownership, a formula may be found in government regulation.

But, observes Mr. Berle, "there is always the certainty that, at some stage in the history of a regulative body, the regulations will be used for purposes which are either corrupt, political, or doctrinaire. Any of these three may produce violent and extremely unhealthy results. A Harry Daugherty running the Securities and Exchange Commission, as at present constituted, or a Whitney running the Federal Reserve Bank, could create a series of interests which would take years to dislodge."

Mr. Berle also takes sharp issue with Secretary of Interior Ickes and U. S. Solicitor General Jackson, who profess to believe in the somewhat naive theory (advanced in a popular book of 1937) that the whole economic life of America is tied up and controlled by a financial dynasty of 60 wealthy families. Mr. Berle says that the concentration of economic power has nothing to do with the private fortunes of individuals.

Again, he disagrees with the Treasury's Brain Truster, Herman Oliphant, who claims that the (now pretty much discredited) undistributed profits tax has the effect of holding Big Business back by its financial shirttail so as to allow Little Business to catch up somewhat.

Mr. Berle says the undistributed profits tax has just the opposite effect because, while it holds back Big Business, it also holds up the expansion of Little Business, with the net result that everybody is the loser—including the tax collector. (You may recall that President Roosevelt signed the last tax bill with great reluctance and only after giving Congress a good bawling out for crippling this tax against the advice of the Treasury's wise men.)

Finally the astonishing Mr. Berle comes out flat-footed and sneers at all wage and hours legislation (this sounds like New Deal treason to your correspondent). Mr. Berle doesn't repudiate the specific law now on the statute books, but he says that labor would be better off with annual income standards and relatively permanent jobs instead of haggling over minimum pay and maximum hours.

Undoubtedly if Mr. Berle's ideas were taken up in earnest, the telephone industry (speaking now of the Bell System) could be given a little more equitable consideration on account of its constant year-in-and-year-out employment and low labor turn-over. Under the present law all industries are thrown into the same hopper—with industries providing catch-as-catch-can jobs for six or eight months a year having the same

CONVENTIONS

Telephone Association of New Hampshire, Hotel Ashworth, Hampton Beach, September 7-8.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, September 21, 22 and 23.

South Dakota Telephone Association, Mitchell, October 5 and 6.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 18, 19, 20 and 21.

Independent Pioneer Telephone Association of the United States, Hotel Stevens, Chicago, Thursday, October 20.

Virginia Independent Telephone Association, Hotel John Marshall, Richmond. November 3 and 4.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, November 14-15.

Kentucky Independent Telephone Association, Brown Hotel, Louisville, November 17-18.

Alabama Independent Telephone Association, Jefferson Davis Hotel, Montgomery, November 28 and 29.

"standards" applied to them as the utilities with their record for steady employment, second only to government civil service itself.

IT DOES NOT seem to be very widely appreciated that enforcement by the Securities and Exchange Commission of section 11 of the Public Utility Holding Company Act (the so-called "death sentence" section) will cause a minor shake-up in the Independent telephone industry as far as ownership of properties is concerned. True, the size and scope of the properties are not of outstanding consequence, but there is a significant stake, particularly in the case of United Telephone & Electric Co., which controls 16 operating telephone companies in a number of states. (You can easily get the details from TELEPHONY'S Directory of the Telephone Industry if you are especially interested.)

Most of these properties were picked up by gas and electric holding companies as part of various deals during the era of holding company expansion. Often, the holding companies just let these telephone properties stay in the families, just as they have continued to operate water companies, warehouses, taxicab and other transportation units, and sundry other properties which came to them in the same way. (One electric holding company even acquired a theatre which it is operating.)

But under section 11, the holding companies will have to get rid of all properties which are not connected with the utility business. And "utility," as defined in the Holding Company Act, means only gas and electric service—not telephone. At least, that is the way this writer construes the clause of section 11, which requires holding companies to reorganize in such a way as to "limit the operations of the holding company system . . . to a single integrated system, and to such other businesses as are reasonably incidental or economically necessary or appropriate to the operations."

Two weeks ago SEC Chairman Douglas sent a letter to 66 gas and electric holding companies and asked them to submit by December 1 any plans which they have made for voluntarily complying with section 11. As all or most of these companies are known to be engaged in drafting such reorganization plans, the Douglas letter was generally regarded by Washington observers as a tip to the boys to get a move on. It also served notice to anybody who might have had other notions that the SEC really means business in enforcing section 11, but wants to do it with as little fighting and as much cooperation as possible.

However, to get back to the telephone industry, there were 13 among the 66 registered gas and electric holding companies (receiving the Douglas letter) whose properties included telephone companies. In addition to the United Telephone & Electric Co. already mentioned, these registered companies were as follows (operating telephone companies in parentheses):

American Utilities Service Corp. (see various companies controlled in TELEPHONY'S Directory); Associated Gas & Electric Co. (Smyrna Telephone Co., Inc., of New York); Citizens Utilities Co. (Public Utilities California Corp.), Colonial Utilities, Inc. (Walden Telephone Co. of New York and Weybridge Light & Power Co. of Vermont).

Commonwealth & Southern Corp. (Tennessee Electric Power Co.); East Coast Public Service Co. (East Coast Telephones, Inc., of Virginia); Engineers Public Service Co. (Puget Sound Power & Light Co.); North Continent Utilities Corp. (New Mexico Public Service Co.); Penn Western Gas & Electric Co. (Nebraska Public Service Co.); Republic Electric Power (Needles Gas & Electric Co. of California); Southeast Power & Light Co. (Southeast Arkansas Telephone & Power Co.); Standard Power & Light Corp. (Northern States and Mountain States Power companies).

Some of the foregoing are simply small local telephone properties operated in conjunction with power service, but they are listed as rendering public telephone service in the SEC registration files.

PREDICTIONS (based upon field information drifting into Washington): Senators Smith of South Carolina and McCarran of Nevada will survive New Deal efforts to "purge" them. . . . Lawrence Camp, New Deal champion to "purge" Senator George of Georgia, will not even "place" in the contest, which is really between George and former Governor Talmadge. . . . Senator Tydings has a tough fight on his hands in Maryland but enjoys a slight edge at this writing (if Tyding loses by one vote, blame your correspondent—a Maryland Democrat who neglected to register for the primaries, September 12). . . . Felix Frankfurter is heavy favorite to succeed the late Supreme Court Justice Cardozo and would be confirmed after a nasty Senate battle.

THE PHILOSOPHER'S STONE

By MISS ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

WHEN HETTY drew her first salary she was elated because she had long promised herself she would some day own a diamond ring. Not one with a large stone that would take a long time to pay for, but rather one that would have sparkle and fire to impress folks.

Shortly after Hetty's dream was realized—she owned a sparkler. However, she soon found out that the monthly instalment payments made her incomings seem small beside her outgoings. In fact, she had not left herself enough margin to take care of a few pleasures, indulgences, or even the necessities of life. And the sparkle of her stone could not satisfy hunger or pay room rent.

How was it, she questioned herself, that her friend Mary Jones never seemed to be short-run for money as she was? One day she asked Mary how it was that she got along so much better than she did when each drew the same amount of salary. "I am always broke, Mary," she added.

"Hetty," said Mary, "you will not be broke when your incomings exceed your outgoings. You own a diamond, but I have a stone that is far more valuable than your diamond, even if your stone was one of the first water, and mine did not cost me a cent. And, Hetty, it keeps me out of debt."

Of course Hetty was incredulous but if she could find a way to keep out of debt that was all she desired, so she asked Mary to tell her about her stone.

Mary replied: "According to Benjamin Franklin, If you know how to spend less than you get, you have the philosopher's stone."

Mathematics for Telephone Engineers

By H. H. HARRISON

ARTICLE EIGHT, SECTION XI, on practical applications of vectors, continues the discussion from the June 25 issue. This mathematics series was especially written for engineers engaged in telephone work.

THE ladder structure previously considered is "tee" formed but there is another arrangement known as a "pi" (π) section in which there are two shunt elements—one at the inlet, and the other at the outlet end of the cell. Either type of structure has two inlet and two outlet terminals and they are, in consequence, termed by some writers "quadripoles."

Fig. 205 (a) is a quadripole of the π type. Two such cells if placed end to end (Fig. 205 (b)) are obviously equivalent to the arrangement shown in Fig. 205 (c).

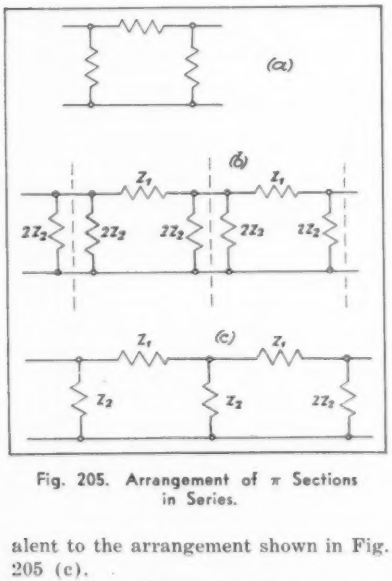


Fig. 205. Arrangement of π Sections in Series.

The characteristic impedance of a π section may readily be obtained from a vector diagram as in the case of the tee section.

Referring to Fig. 206 (a), there is shown a low-pass π section filter closed by a resistance equal to its characteristic impedance Z_k. Fig. 206 (b) is the vector diagram for this. The figure is symmetrical for, in the pass range, V_1, V_2, V_n are all equal to one another as are also I_1, I_2, I_n.

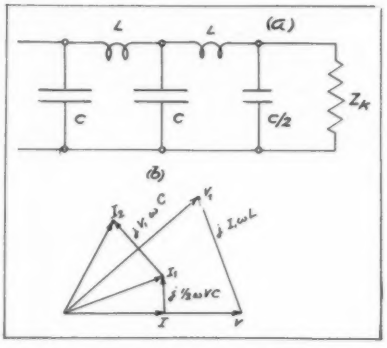


Fig. 206. Graphical method of determining the characteristic impedance of a tee-section filter.

In consequence,

$V_1/I_1 = 0.5\ jwLI_1/0.5\ jwV_1C$ or

$(V_1)^2C = L\ (I_1)^2$

but $V_1 = V$ and $I_1 = \sqrt{I^2 + (\frac{1}{4})w^2V^2C^2}$

Therefore $V^2C = L\ (I^2 + \frac{1}{4} \cdot w^2V^2C^2)$

and $V^2C - (\frac{1}{4} \cdot w^2V^2C^2L) - LI^2 = 0$ or,

$V^2C\ (1 - \frac{1}{4} \cdot w^2V^2CL) - LI^2 = 0$

Dividing by I^2 and multiplying by $1/C$,

$(V^2/I^2)\ (1 - \frac{1}{4} \cdot w^2CL) - L/C = 0$

or

$(V^2/I^2 = (Z_k)^2\ (L/C) \times 1/(1 - \frac{1}{4} \cdot w^2$ $LC)$ from which

$Z_k = \sqrt{(L/C)} \times 1/\sqrt{(1 - \frac{1}{4} \cdot w^2LC)}$

The characteristic impedance of a π network is thus $\sqrt{(L/C)}$ initially $(w = 0)$ and infinity when $\frac{1}{4} \cdot w^2LC = 1$.

Fig. 207 gives graphs for Z_k for π and T section filters. At the critical frequency $Z_{k\pi}$ is infinity and Z_{kt} zero.

Thus in a low-pass filter for which $C = 1 \times 10^{-6}$ farads and $L = 0.25$ henry, $Z_\infty = \sqrt{L/C} = 500$ ohms.

Therefore,

$$Z_{kt} = 500\sqrt{1 - (f/f_c)^2}$$ and

$$Z_{k\pi} = 500/\sqrt{1 - (f/f_c)^2}$$

Two interesting cases arise where a filter is closed on an impedance which is either zero or infinity. Fig. 208 is drawn for these. The increments of

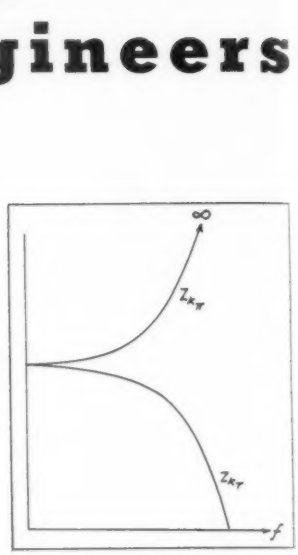


Fig. 207. Variations in characteristic impedance of a tee and a pi section filter.

voltage and current in passing from section to section, Fig. 208 (a), are given by the equations:

$$V_n - V_{n-1} = wLI_{n-1}$$

$$I_n - I_{n-1} = wV_nC$$

The current increments lead on the voltage increments by 90° and the voltage is a maximum where the current is a minimum and vice versa, as shown in Fig. 208 (b). Since the voltage and current are 90° out of phase with each other, no energy will be transmitted through the chain and the case represented is that of complete reflection.

Fig. 209 represents a case where the closing impedance is neither $\sqrt{L/C}$ ohms, zero, nor infinity. The resulting voltages and currents form ellipses and there is a large in-phase component at

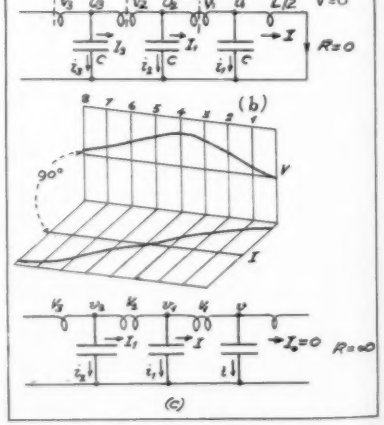


Fig. 208. Illustrating behavior of several tee circuits in series with (a) the far end closed and (b) open.

each section. The energy is partly transmitted and partly reflected.

There is another extremely effective method of studying the filtering effect of different types of quadripole. Consider the conditions which will make Z_{oo} a pure resistance which, as has already been shown, is necessary over the pass range. If Z_{oo} is a pure resistance, $Z_1(Z_2 + Z_1/4)$ must be a positive real number. This is so if

$Z_1 = jX_a$ (inductive reactance)
and
$(Z_1 + Z_1/4) = jX_b$ (capacitive reactance) or vice versa.

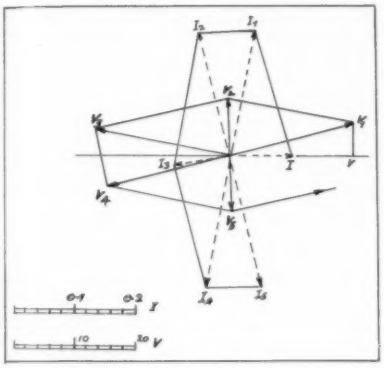


Fig. 209. Case where R_{oo} is not $\sqrt{L/C}$ while not zero or infinity. Reflection is partial.

In either case

$$Z_1(Z_2 + Z_1/4) = -j^2X_aX_b = X_aX_b.$$

Therefore $Z_{oo} = \sqrt{(X_aX_b)}$.

To make $(Z_2 + Z_1/4)$ the opposite type of reactance to Z_1, Z_2 must be:

(a) the opposite type to Z_1,

(b) greater in absolute magnitude than $Z_1/4$.

Since Z_2 is opposite in sign to Z_1, $Z_1/4Z_2$ must always be negative. Hence its upper limit is $Z_1/4Z_2$ less than 0. Further, $Z_1/4Z_2$ must be a fraction less than unity since Z_1 is greater than Z_1. Hence $Z_1/4Z_2$ must lie between -1 and $+1$. But it has been shown that its upper limit is 0.

Therefore,

$Z_1/4Z_2$ is less than 0 and
$Z_1/4Z_2$ is greater than -1.

The conditions for the band frontiers are thus $Z_1 = 0$ and $Z_1 = -4Z_2$. By calculating Z_1 and $-4Z_2$ over a band of frequencies, the stop and pass bands are readily located.

Fig. 210 represents this method applied to a high-pass and a low-pass filter. Fig. 211 establishes the pass and stop bands for a low-pass and high-pass band filter.

The Derived Filter

Referring to Fig. 212 (a), an ordinary low-pass filter is shown. Fig. 212 (b) is a filter which has a high attenuation (infinity) at a frequency f (infinity)—not an infinite frequency but a frequency which makes the shunt element resonant and its impedance zero in consequence.

By suitable choice of L_2 and C the frequency f (infinity) may be made to occur at any point in the attenuating band.

If it were possible to place a number of filter sections in series with f (infinity) at different points, a high overall value of the attenuation α would be secured throughout the attenuation range. It is necessary, for this to be possible without reflection, that the characteristic impedances of each section be equal to each other at all frequencies. If the characteristic impedances are alike at all frequencies, transmission would be the same since in this band, and only in this band, is Z_{oo} a pure resistance.

If in Fig. 212 (d) Z_4 and Z_5 are opposite reactances, then

$$Z_{oo}' = \sqrt{Z_3(Z_4 + Z_5)Z_3^2/4} \quad \ldots\ldots\ldots\ldots (A)$$

Now Z_4 and Z_5 are opposite and, therefore, one of them is of the same type as Z_3, say Z_4. For a low-pass filter Z_3 and Z_5 are of the same type and writing,

$Z_3 = mZ_1$, $Z_4 = nZ_1$ and $Z_5 = lZ_2$

and inserting these values in (A),

$$Z_{oo}' = \sqrt{(mZ_1\ (nZ_1 + lZ_2) + m^2Z_1^2/4)}$$
$$= \sqrt{(mnZ_1^2 + mlZ_1Z_2 + m^2Z_1^2/4)}$$

Hence for $Z_{oo} = \sqrt{Z_1Z_2 \times Z_1^2/4}$ to equal Z_{oo}',

$$ml = 1 \text{ and } l = 1/m$$
$$4mn + m^2 = 1$$
$$n = (1 - m^2)/4m.$$

The condition for equal characteristic impedances is

$Z_{oo} = mZ_1$, $Z_4 = (1 - m^2) \cdot Z_1/4m$, and $Z_5 = Z_2^2/m$.

Thus, if in Fig. 212 (c) $Z_1 = L$ and $Z_2 = C$, then

$Z_{oo} = mL$, $Z_4 = (1 - m^2)L/4m$ and $Z_5 = C/m$.

In order that part of the shunt impedance is true at all frequencies it is necessary that it be of the same type as Z_1. Thus $(1 - m^2)/4m$ must always be positive or m is less than 1.

Such filters are known as "m derived," being derived from the prototype (Fig. 212 (a)).

If m is varied for the different sections in a filter chain, then the point of infinite attenuation will be spread over the stop band and the high overall attenuation before referred to will be attained.

The reader must not regard this section as a complete treatment of the band filter. This device is an excellent example of the application of vectors to the solution of electrical problems and it is on this account that it has been included in this section of the series. It is hoped that it will be found a useful introduction to the orthodox treatment in various text books.

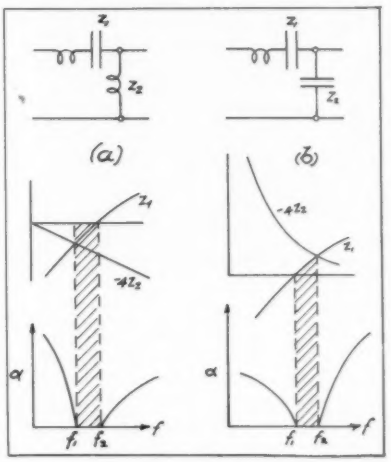


Fig. 211. The location of stop and pass bands for two types of band pass filter.

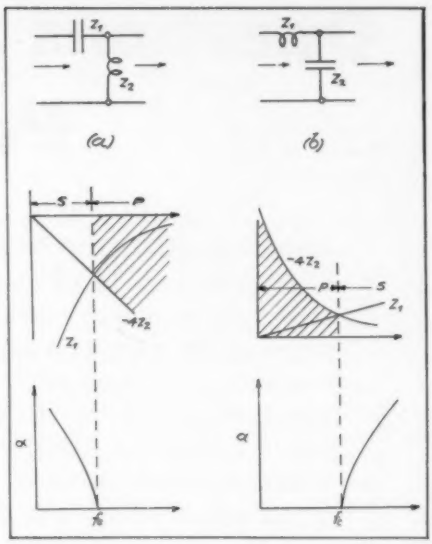


Fig. 210. Graphical method of locating the stop and passbands of a high-pass and low-pass filter.

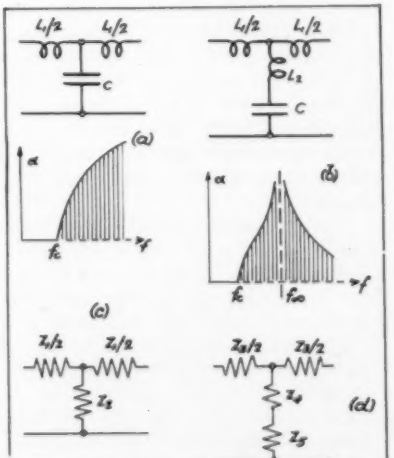


Fig. 212. Showing how an "m derived" filter section is obtained.

Questions Asked Concerning Power Line Interference

VARIOUS METHODS described for eliminating inductive interference to rural telephone lines resulting from extension of electric distribution lines. Discussion of payment or apportionment of expense of moving or metallicizing telephone lines and general causes of disturbances. H. W. Hubenthal, secretary of Oklahoma Telephone Association, answers questions on inductive interference propounded by telephone men at annual convention of that organization

FACING a number of serious problems of electrical inductive interference arising from the rural electrification program in Oklahoma, delegates to the recent annual convention of the Oklahoma Telephone Association at Oklahoma City listened intently to the answering of a number of questions dealing with this subject by H. W. Hubenthal, secretary of the association, who was formerly engineer for the Oklahoma Corporation Commission.

Questions prepared in advance were propounded by Endsley Jones, division superintendent, Western Light & Telephone Co., Kingfisher, Okla.; L. M. Baker, district manager, Southwest Telephone Co., Purcell, Okla., and J. W. Walton, vice-president, Oklahoma Telephone Co., Broken Arrow, Okla.

First taking up Mr. Jones' questions, Mr. Hubenthal explained the Rural Electrification Administration program of the federal government now being carried out throughout the United States. He explained that this agency was established in 1936 to provide for rural electrification and other purposes.

In reply to Mr. Jones' query as to the effect of completing and energizing rural electric lines upon present rural telephone lines, Mr. Hubenthal said that although only two REA projects have thus far been completed in Oklahoma—the Consumers Rural Electric Co., of Kingfisher, and the Kay County Electric Cooperative, of Blackwell—serious inductive interference already has been set up on rural telephone lines in Okeene and adjacent territory, and impairment or destruction of telephone service is threatened elsewhere.

Asked by Mr. Jones if there is a remedy, Mr. Hubenthal replied in the affirmative. Under former standards of electric power line construction, where circuits were properly balanced and free of ground, a metallic telephone line could be reasonably protected from disturbances caused by nearby highly-charged power leads, he said.

The trouble now is, he continued, that there is a tendency on the part of power companies to substitute the ground as a neutral. This materially increases the objectionable effect on telephone lines.

Three Suggested Ways of Remedying Interference

Three ways of remedying these interferences were suggested by Mr. Hubenthal, as follows:

(a) Sufficient clearance or separation between telephone and power lines to get away from inductive interference.

(b) The metallicizing and properly transposing of telephone lines.

(c) The balancing of power circuits, which means to keep the power lines free from ground and transposing them somewhat as telephone lines are transposed.

Replying to Mr. Jones' question as to who should bear the expense of any changes, Mr. Hubenthal stated that a number of states provide for allocation of such costs. In Oklahoma this is provided for in the corporation commission's order No. 1946 supplemented by No. 11795, which provides:

(a) In cases of moving and relocating telephone lines, the power company shall bear the total expense.

(b) In cases of metallicizing telephone lines, the power company is required to bear the cost of materials such as wire, brackets and insulators needed for the installation of the second wire, as well as the cost of repeating coils, protectors and their housing and grounds. The power company also can be required to bear a part of extraordinary expenditures.

Mr. Hubenthal stated, in reply to another question, that in every case a repeating coil should be used in connecting grounded and metallic lines to obtain a balanced line condition.

When lines are badly exposed, or in danger of coming in contact with power lines, Mr. Hubenthal said, they should be removed to a safe location whenever possible. In any event all telephone stations should be protected by suitable arresters against lightning discharge as well as heavy voltages through contact with electric lines. Protectors must be equipped with a good ground.

Mr. Jones asked if rural electric lines, installed by cooperatives and others, should be constructed to conform with specifications provided by the corporation commission. The speaker said rule 103 provides that construction shall be made according to accepted good practices for given local conditions. Where electric concerns fail to abide by such rulings, the only recourse is a suit in district court for damages to compel compliance with proper standards, he added.

Asked if telephone managers and other employes should notify rural and city subscribers immediately upon learning of an electric line project in their territory, Mr. Hubenthal replied that this should be done.

In addition, he said, farm agents, county commissioners, officers of farm organizations and all farmers who are prospective patrons of the electric lines should be advised that there is danger to life and property from improper construction. They

also should be warned that their telephone service may be greatly impaired or completely destroyed if proper protection is not given to telephone lines.

Telephone managers, Mr. Hubenthal advised, should work on a friendly and cooperative basis with the authorities responsible for the electric construction and convince them and their prospective customers that the telephone company wants them to have electric as well as telephone service.

When asked by Mr. Jones if all rural metallic telephone lines should be balanced when paralleling rural electric lines, Mr. Hubenthal replied that they should be if this were possible, which it is not; but in lieu thereof the telephone companies should use the present best known remedial methods.

Three General Causes of Inductive Interference

Mr. Hubenthal outlined the following three general causes of disturbances in telephone lines, resulting from proximity of power lines: Electromagnetic induction, electrostatic induction and leakage.

A number of questions on the subject were then propounded by L. M. Baker, district manager of the Southwest Telephone Co., Purcell. When asked why telephone companies are concerned with development of rural electrification, Mr. Hubenthal replied that extension of rural electric power lines in close proximity to telephone lines will greatly impair telephone service unless telephone lines are properly constructed or balanced to overcome inductive interference.

Asked by Mr. Baker what has brought about the recent multitude of controversies between rural electrification managers and telephone people, Mr. Hubenthal said this was due to refusal of the REA, generally, to cooperate with owners of telephone properties by offering just compensation for the extra expense incurred by telephone companies in coordinating their properties, metallicizing and otherwise rebuilding their lines to eliminate inductive interference.

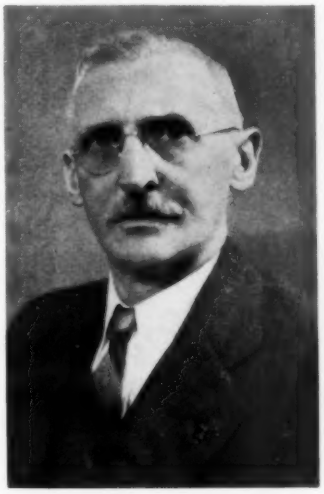
Mr. Baker asked if these problems are encountered only in connection with REA construction. Mr. Hubenthal replied that this is apparently so, as private electric companies, so far as he knows, are complying with the agreements or regulations providing for settlement of inductive interference problems.

The most satisfactory methods of correcting inductive interference were pointed out as follows by Mr. Hubenthal in reply to Mr. Baker's questions:

(1) Parallels should be avoided wherever practicable.

(2) In parallels the telephone circuit should be metallic (two wires) either completely or at least for its exposed part.

(3) Power circuits and telephone circuits should be kept at a uniform separation so far as practicable; sections having different separations for considerable distances should be treated as separate parallels.



H. W. HUBENTHAL, Oklahoma City, secretary of the Oklahoma Telephone Association, offered answers to puzzling inductive interference problems at the annual convention of the association.

(4) In parallels the power circuit should be transposed to neutralize the inductive on the telephone circuit from balanced currents, so far as practicable and the telephone circuit should be transposed to equalize the induction on the two wires between transpositions on the power circuit: Whichever plan is the most economical should be employed.

(5) Placing telephone wires underground will help to minimize interference. It will be necessary to handle cooperatively each individual problem or situation on the basis of actual field conditions. Therefore, it is impossible to lay down any hard and fast rule.

Answering Mr. Baker's question as to whether there is any satisfactory mechanical method of eliminating inductive interference from grounded telephone lines, Mr. Hubenthal stated that there is on the market a filter which, it is claimed, will eliminate certain of the objectionable noise frequencies below 800 cycles, induced on telephone lines by power lines.

This apparatus, Mr. Hubenthal stated, is a comparatively recent development and its usefulness has not yet been thoroughly demonstrated. Separation of parallels between telephone and power lines, or metallicizing the telephone lines, is the surest remedy, he said.

Metallic Lines Give Better Telephone Service

The speaker also pointed out that metallic lines, properly balanced and maintained in every respect, give better service than grounded telephone lines. Making lines metallic adds to the plant investment, of course because of the additional wire and its support and this larger plant, naturally, increases costs of operation, maintenance, taxes, etc.

In reply to Mr. Baker's question as to whether telephone companies thus metallicizing their lines should be allowed increased rates, Mr. Hubenthal replied that if a company can prove that present rates do not afford it a reasonable rate of return and proper allowance for depreciation, it is entitled to an increase in rates.

J. W. Walton, vice-president, Oklahoma Telephone Co., Broken Arrow, submitted a list of six questions which were answered in detail by Mr. Hubenthal. In connection with the first of these, Mr. Hubenthal pointed out that substantial construction in accordance with the specifications of Order No. 1946 of the Oklahoma Corporation Commission, is the first requirement.

Proper Protection at the Central Office

In addition, proper protection must be afforded at the central office, including 7-ampere fuses in each side of the line, proper heat coils and carbon discharge blocks, air-gaped to ground on protector terminals. Cable terminals should be similarly protected.

Metallic lines at the subcriber's station should be protected with 7-ampere fuses and carbon discharge blocks or with similar types of protectors. Ground terminals of the protectors must be connected direct to a good ground by a No. 14 gauge copper wire run straight to the ground rod without spiralling.

"If a line is in a hazardous location," said Mr. Hubenthal, "it

(*Concluded on Page* 20)

AUTOMATIC ELECTRIC RELAY SWITCHBOARDS Prove Their Worth In Daily Use

This is the Rotor Relay—small size, compact and sturdy—which contributes so much to the smoothness and reliability of operation of Automatic Electric's relay boards.

AUTOMATIC ELECTRIC'S newest relay switchboards, introduced a few short months ago, have already been adopted in substantial vol by leading operating organizations. Now, on daily duty in the field, are proving in action the advantages we have advanced for this new princ in relay type operation—namely, an outstanding simplicity in design, smoo ness in performance and lasting superiority of service to the subscriber.

Here is a partial list of installations and orders, to date, since the int duction of this equipment: and these, of course, are in addition to the m other relay boards which Automatic Electric supplied prior to the developm of the rotor relay.

Telephone Company	Town	No. of Li Wired	Equi
Lincoln Telephone & Telegraph Co.	Octavia, Nebr.	100	50
Houghton Lake Telephone Co.	Houghton Lake, Mich.	60	30
Mid-West States Utilities Co.	Lomira, Wisc.	60	40
Intermountain Telephone Co.	Laswell, Va.	60	40
Harrinsonburg Mutual Telephone Co.	Grottoes, Va.	60	40
St. Croix Valley Telephone Co.	Balsam Lake, Wisc.	100	60
Ohio Standard Telephone Co.	Piketon, Ohio	100	90
De Kalb Ogle Telephone Co.	Steward, Ill.	60	30
South Pennsylvania Tel. Co.	Rogersville, Pa.	100	30
Rosalia Telephone Co.	Thornton, Wash.	60	30

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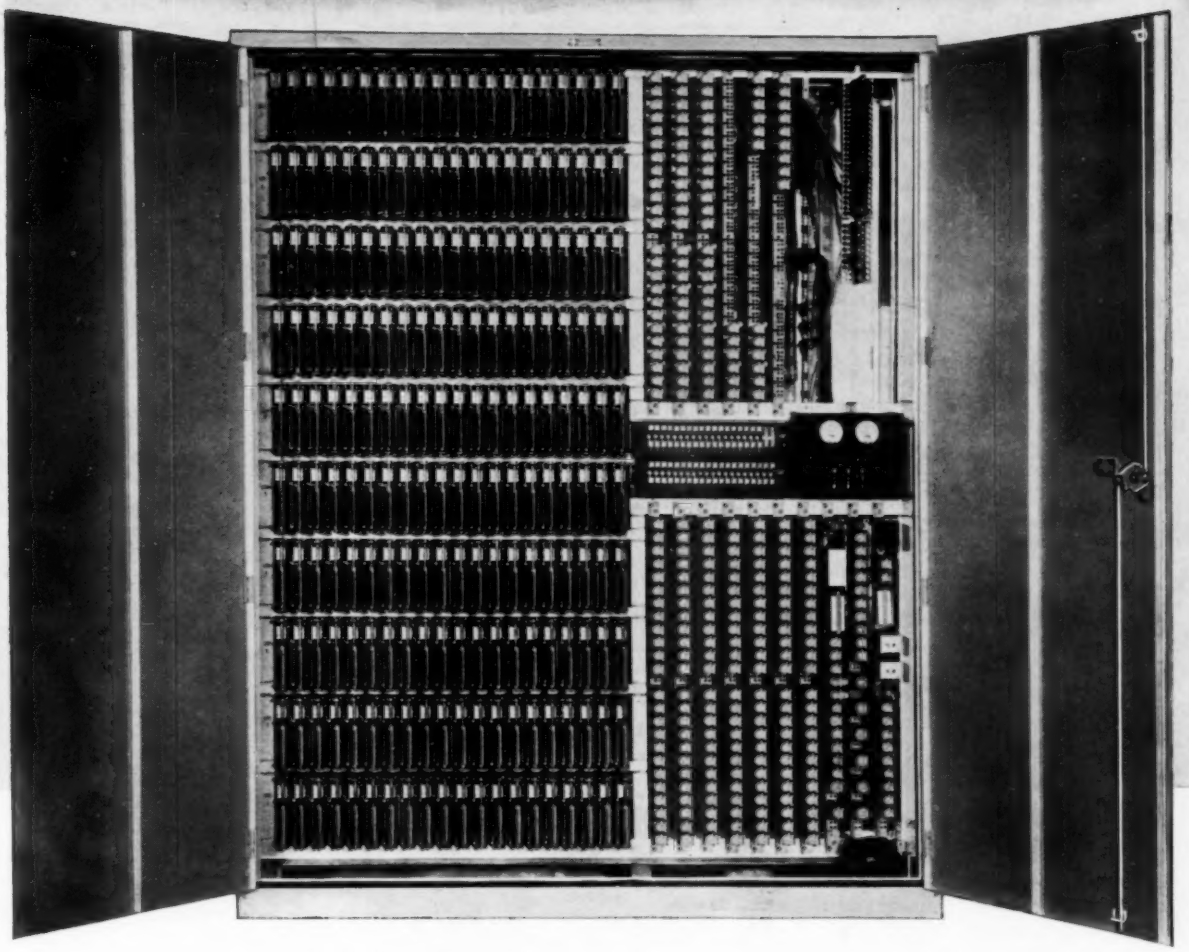

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Now used as a standard unit on Automatic Electric's newest type of relay switchboards, the Rotor Relay merits the careful study of every operating executive. Where circumstances are such as to make relay type operation economic and practical, the Rotor Relay switchboard represents the peak of operating efficiency and economy! Write for further information, giving us complete details regarding your exchange.

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(*Concluded from page* 17)

should be moved rather than to try protective devices as a safety measure. Standard practice is for the protectors to be placed at the central office and on cable pole terminals and at the subscriber's station, as previously stated. Intermediate protector installations are not needed if proper construction methods are followed in accordance with the specifications outlined in the corporation commission orders Nos. 1946 and 11795."

Answering Mr. Walton's question as to what length, kind and size of ground rod should be used at the subscriber's station protector and at line arresters, Mr. Hubenthal stated that the length of the ground rod depends upon the distance to reach an earth strata of low resistance, preferable wet or at least moist earth. Ordinarily a one-half inch rod will serve the purpose, he said.

Replying to a question as to what should be the minimum gauge of ground wire used at subcriber's station as well as line wire protectors, Mr. Hubenthal said it should be No. 14 copper wire. A ground connection of as nearly a zero resistance as can be obtained should be employed. From 10 to 20 ohms of resistance is usually considered good. Water pipe grounds are preferable to rods.

In answering other questions propounded by Mr. Walton, Mr. Hubenthal stated that the Oklahoma Corporation Commission has not set up special accounting treatment. Telephone accountants, however, will perhaps agree, Mr. Hubenthal stated, with the following method of accounting:

"(a) The original installed cost of the old material displaced should be retired by charging depreciation reserve and crediting property account.

(b) When the electric company furnishes labor and new material, there is a donation to the telephone company equal to the value of the installation labor and new material. The telephone company should capitalize the cost of the new material and the installation labor, crediting material and supplies (stores) for the new material used and crediting contributions to telephone plant for the value of the labor and material furnished by the electric company."

Mr. Hubenthal pointed out that corporation commission order No. 11795 provides that when new right-of-way must be acquired and tree trimming is also involved, the cost must be borne by the electric company in removing and relocating telephone poles and wire lines.

The cost of extraordinary expenditures necessary, either for moving or relocating telephone lines and for metallicizing telephone circuits is also to be borne proportionately by the electric and telephone companies on a basis to be mutually agreed upon by the two parties. In case of disagreement, the division of the total cost is to be determined by the corporation commission.

This commission order, Mr. Hubenthal pointed out, provides that all costs necessary to restore the service of a metallic line impaired by a power line, shall be borne on a 50-50 basis by the power company and the telephone company. The commission order also prescribes that power wires, crossing over telephone wires or cables operating at from 0 to 750 volts, must clear four feet or more. Power lines crossing over telephone wires or cables operating at from 750 to 50,000 volts must clear by six feet.

In reply to another question by Mr. Walton, Mr. Hubenthal stated that a power company, in crossing a telephone line, should comply with class "A" or class "B" construction, providing for double-arming and double pins or brackets on each pole used for such crossing. The telephone company should inspect such crossings and, if the commission rules have not been complied with, any discrepancies should be brought to the attention of the power company for correction.

Mr. Hubenthal also pointed out that it is generally claimed and understood in Oklahoma that municipally-owned electric light plants, confined within the municipal boundaries, do not come under the jurisdiction of the corporation commission. But all construction and operation of electric concerns in rural communities or beyond the confines of a city or town, come under jurisdiction of the corporation commission. (The commission has recently ruled that it does not have authority over REA cooperatives.)

Commission and Court Activities

REA Test Case Taken to Nebraska Supreme Court

The Rural Electric Administration will test in the Nebraska Supreme Court the authority of the Nebraska State Railway Commission to order it to pay the reasonable cost of transforming rural grounded telephone lines to metallic lines or otherwise getting rid of inductive interference.

At a hearing Monday, August 22, before the commission, attorneys for the Eastern Nebraska Public Power District admitted that after the energizing of their lines paralleling the grounded rural lines of the Union Telephone Co., of Unadilla, service over the latter had been greatly impaired and at times was impossible to use, as the commission engineer had testified after making an examination of the properties.

The power district attorneys said that regardless of whether the power lines had been or had not been constructed in accordance with the National Electrical Safety Code and rules and regulations of the commission—that being some of the complaints before the commission—it was impossible to prevent what had occurred.

After much wrangling a stipulation was agreed upon as to the facts, and after that the district's attorneys argued that the commission had no jurisdiction over and hence no authority to order a division of the costs of correction of the situation. The commission indicated that it would hold to its former decisions, and a record was thereupon made upon which the district can appeal to the supreme court.

Represented at the hearing were attorneys for the district from Washington, D. C., and attorneys for other rural public power districts, who desired to but were not permitted to intervene. C. A. Sorensen, attorney for three of the districts, asked that the hearing proceed and that testimony be taken as to what are the reasonable costs of transformation that the commission had ordered in its cases and how far away from a telephone line must a power line be constructed to avoid interference.

Testimony taken was to the effect that in the case of the Palmyra Telephone Co., which had intervened, the

district had not provided proper clearances at all points and that it had constructed lines along highways that it had no commission authority to occupy and had abandoned roads for which permission had been given. The Union company complained that the district had insisted upon building its power lines along the main leads from the telephone exchange, when roads were available a mile on either side where only one telephone line was in place, and claimed this was arbitrary and unnecessary conduct.

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Nebraska Commissioner Wins Renomination

Floyd L. Bollen, chairman of the Nebraska State Railway Commission, won by half a thousand votes, a renomination at the hands of the democrats in the recent primary. He will be opposed at the election by Duane T. Swanson, an Omaha lawyer, who was the republican nominee two years ago, but who lost to Commissioner F. A. Good.

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Overrules City's Protest in Ohio Bell Case

The complaint filed by the city of Girard, Ohio, through its mayor on May 14 with the Ohio Public Utilities Commission, protesting against the commission's order of April 26 directing the Ohio Bell Telephone Co. to refund $7,250,000 to its subscribers in 45 cities and towns in the state, was formally overruled by the commission August 16.

The protest of the city of Girard was made on the ground that the subscribers of the telephone company there would not participate in the refund, ordered in the final settlement of the telephone company's state-wide rate case.

In passing upon the objection to the order, the commission held that the protest and complaint were not well taken "and should be and hereby are overruled."

Another case which stands in the way of the refund is a protest and appeal of several Cleveland residents that now awaits a decision by the Ohio Supreme Court.

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Commission Before Court In Bell Rate Increase Case

The Oklahoma Supreme Court ordered the Oklahoma Corporation Commission to appear and show cause, on August 24, why the application of the Southwestern Bell Telephone Co., for a temporary increase in exchange rates in 14 state cities should not be granted.

The Bell company petitioned the court for a writ of supersedeas, after application for the writ had been denied by the commission following issuance of its order refusing to grant the temporary rate increases. Cities involved in the application are: Ada, Ardmore, Blackwell, Chickasha, El Reno, Guthrie, Lawton, McAlester, Norman, Okmulgee, Ponca City, Sapulpa, Shawnee and Stillwater.

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Company Seeks Toll Charge to 40 Wisconsin Towns

The application of the Commonwealth Telephone Co. for authority to eliminate free toll service to 40 points in Iowa, Sauk, Richland and Crawford counties in the state of Wisconsin, and substitute standard toll charges, will be heard by the Wisconsin Public Service Commission September 12.

The company submitted a new proposed schedule of free toll service which eliminates 40 out of 50 points to which free toll service is now given.

The schedule proposed by the company would eliminate free toll service from Eastman to Barnum, Bell Center, Ferryville, Gays Mills, Mt. Sterling, Petersburg, Soldiers Grove, Steuben; from Ferryville to Barnum, Eastman, Gays Mills, Seneca, Soldiers Grove, Steuben, Sylvan; from Lone Rock to Muscoda; from Mt. Sterling to Barnum, Boaz, Sastman, Gays Mills, Liberty Pole, Mt. Zion, Soldiers Grove, Steuben, Wauzeka; from Muscoda to Lone Rock, Spring Green; from Seneca to Barnum, Excelsior, Ferryville, Gays Mills, Liberty Pole, Mt. Hope, Mt. Zion, Soldiers Grove, Steuben, Wauzeka; from Wauzeka to Mt. Sterling, Steuben and Seneca.

Standard toll charges would be made to these points.

Under the proposed schedule, free toll service would be continued from Eastman to Seneca, Wauzeka; from Ferryville to Mt. Sterling; from Lone Rock to Avoca, Spring Green; from Mt. Sterling to Ferryville, Seneca; from Muscoda to Avoca; from Seneca to Eastman, Mt. Sterling; from Wauzeka (company subscribers only) to Eastman.

Present charges, the company claimed, are "unfair and inequitable."

The commission meanwhile will study the books, accounts, practices and operations of the company.

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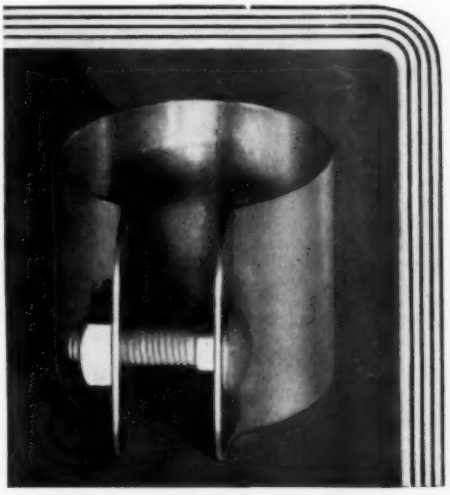
Summary of Commission Rulings and Hearings

Federal Communications Commission Washington, D. C.

July 30: Application filed by Bell Telephone Co. of Pennsylvania and American Telephone & Telegraph Co. seeking authority to supplement existing facilities between Mt. Jewett Junction and Bradford, Pa.

August 3: American Telephone &



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Telegraph Co. and New Jersey Bell Telephone request authority to supplement existing facilities between Freehold and Manahawkin, N. J.

August 17: Examiner Irwin filed report recommending that the FCC approve the acquisition by the Southwestern Bell Telephone Co. of the properties of the United Telephone Co. of Kansas which has been under virtual Bell control since 1910. For the purpose of transfer the interstate toll lines were appraised at $175,000 and operating economies estimated at $55,000 a year.

August 17: Examiner Seward, in 10,000-word report, recommended denial of the petition of the Oklahoma-Arkansas Telephone Co., of Poteau, Okla., for re-establishment of toll line connection with the Southwestern Bell Telephone Co., disconnected in 1928 for failure to pay toll charges.

Georgia Public Service Commission

August 8: Order issued directing the Georgia Continental Telephone Co. to reduce the business telephone rate at Monroe one dollar a month, residence individual 25 cents, and residence two-party 50 cents, effective September 1.

August 8: Order issued approving an increase of 50 cents a month in the business rate of the Southern Bell Telephone & Telegraph Co. at Hogansville to permit the installation of dial equipment.

The commission denied the Southern Bell company permission to install the dial system at Millen without an increase in the rate.

Michigan Public Utilities Commission

August 25: Hearing in Lansing on application of the Morenci Telephone Co. for authority to issue securities.

September 7: Hearing in Lansing on application of the Michigan Associated Telephone Co. for permission to purchase certain telephone property.

September 9: Hearing in Lansing on application of the Pickford Telephone Co. for authority to purchase certain telephone property and for a certificate of convenience and necessity.

Minnesota Railroad & Warehouse Commission

September 7: Hearing in Breckenridge on application of the Breckenridge Telephone Co. for authority to increase its rates at Breckenridge.

September 12: Hearing in Foreston on application of the Foreston Rural Telephone Co. for authority to increase its schedule of rates at Foreston.

Missouri Public Service Commission

August 10: Authority granted B. E. Poling, of Mokane, to sell the Mokane Telephone Co. to C. E. Cooper of Troy, Kans. The purchase price was $2,500.

August 17: Order issued approving a proposed transfer by which ownership of the Laredo Telephone Co. in Grundy County would pass to Frank W. Bentley, who also owns and manages the Galt Telephone Co.

Under the proposal J. E. Thomas, present owner of the Laredo company, would sell to O. C. Kilburn, who in turn would sell to Mr. Bentley. The latter is directed to file a rate schedule with the commission.

Nebraska State Railway Commission

August 16: Application filed by Lincoln Telephone & Telegraph Co. for authority to increase rates at its Weeping Water exchange; set for hearing Aug. 29. The company rebuilt its exchange, which was destroyed by fire, and placed all service on a metallic base.

August 16: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to revise its general tariffs in minor respects; approved as asked.

August 16: In the matter of the application of the Nebraska Continental Telephone Co. for authority to revise tariffs, rules and regulations governing its Kearney exchange; approved as asked subject to 30-day complaint.

August 22: Hearing held on order asked by the Union Telephone Co. of Unadilla, requiring the Eastern Nebraska Public Power District to take whatever steps are necessary to correct excessive induction upon telephone lines following energizing of its parallel power lines; testimony presented and matter taken under advisement.

Ohio Public Utilities Commission

August 16: The Warren Telephone Co. having advised that of the $90,000 refund ordered repaid by the commission's order of February 28, 1934, all but $9,300 has now been paid, asked a reduction of its surety bond from $60,625 to $9,300 on August 16.

The reduction was approved with the reservation to the commission of the right to require additional bond or surety. The order provided that the refunds are to be completed at Warren by January 1, 1939.

August 16: Application filed by the Adamsville Telephone Co. seeking to increase rates as follows:

Business independent line $2.00 to $4.50; business two-party, $1.75 to $4.00; residence independent from $2.00 to $3.50; 12-party line from $1.50 to five-party at $2.00; residence rural $2.00.

August 16: Application filed by the Peoples Telephone Co., McConnelsville, asking for authority to increase as follows:

Business independent, $2.00 to $4.50; business two-party, $1.50 to $4.00; business rural $1.50 to $3.75; residence independent $1.50 to $3.00; residence five-party $2.00; residence rural $2.00.

August 16: After a hearing on its application, the Ohio Associated Telephone Co. was authorized to increase its rates at Ney, effective August 17, as follows:

Business independent, $2.40 to $3.00; business rural, $2.15 to $259; residence independent, $1.90 to $2.00; residence four-party, $1.65 to $1.75; residence rural $1.65 to $1.75.

August 16 Order issued formally overruling the complaint filed May 14 by the city of Girard, through its mayor, protesting against the commission's order of April 26 directing the Ohio Bell Telephone Co. to refund $7,250,000 to its subscribers in 45 towns and cities.

August 17: The secretary of the commission certified his report on the application of the Ohio Associated Telephone Co. to revise rates at Ft.Recovery:

Business independent, $2.50 to $3.25; business two-party, $2.00 to $2.75; business rural, $2.00 to $2.50; residence independent, $2.00 to $2.25; residence four-party, $1.50 to $1.75; residence rural $1.50 to $1.75.

Comparable to the company's rate base of $52,741.06, the commission's engineers find $50,411.47. The auditing study discloses that based upon the new rates the company's income will be $1,882.69 short of paying actual operating expenses and providing an allowance of $2,081.87 for depreciation and paying $661.12 in taxes.

August 19: The United Telephone Co. was authorized to file a new schedule establishing the following rates for the new automatic service which the company is ready to inaugurate in the Lakeview-Russels Point exchange:

Business independent line, $45 per year; business two-party $39 per year and business rural telephones $33 per year, all of the wall type. Residence independent, $33 per year; residence two-party, $24 per year and residence rural $24, all wall type.

August 19: Authority granted The Ohio Bell Telephone Co. to revise its Berea exchange base rate area to include additional territory where the demand has arisen for urban service and to exclude certain undeveloped territory.

August 19: A report upon the application of the Ohio Associated Telephone Co. to increase its rates as follows at Mendon, was certified by the secetary of the commission:

Business independent $2.00 to $3.00; business rural, $1.25 to $2.50; residence independent, $1.50 to $2.00; residence four-party, $1.25 to $1.75 and residence rural, $1.25 to $1.75.

Where the company submitted a rate base of $32,004.44 the commission's engineers recommended $26,543.74. The report closed with the statement that the revenue under the proposed rate will be $532.02 short of providing for a proper allowance for depreciation and the payment of taxes after meeting reasonable operating expenses.

Oklahoma Corporation Commission

August 16: Order issued approving the transfer of telephone exchanges at Collinsville and Haskell, owned by the Southwestern Bell Telephone Co., to James Thompson of Tulsa. In return, Mr. Thompson traded to the Bell interests his telephone exchanges at Medford and Britton. Rates at the four points will remain unchanged.

Pennsylvania Public Utility Commission

August 9: The South Penn Telephone Co., furnishing service from Waynesburg and Rogersville exchanges, Greene County, filed a new tariff, making increases, decreases and changes in existing rates, effective October 15.

Transfer of Waynesburg subscribers to Rogersville effects the following increases and decreases in toll rates applicable to those subscribers:

Carmichaels, 10 to 15 cents; Deep Valley, 15 to 10 cents; Frederickstown, 10 to 15 cents; Garrison, 15 to 10 cents; Greensboro, 15 to 20 cents, Jefferson, 10 to 15 cents; Kirby, 10 to 15 cents; Marianna, 10 to 15 cents; Mt. Morris, 15 to 20 cents; Rices Landing 10 to 15 cents; Wind Ridge, 15 to 10 cents.

August 11: Bell Telephone Co. of Pennsylvania ordered to extend the area of its Harrisburg exchange to include the territory of lower Paxton township, Dauphin county. The order is conditional on the company securing in the territory a minimum of four subscribers for at least a year.

Wisconsin Public Service Commission

September 12: Hearing in Boscobel on application of the Commonwealth Telephone Co. for authority to eliminate free toll service to 40 points in Iowa, Sauk, Richland and Crawford counties, and to substitute standard toll charges.

Financial Operating News and Data

Annual Report of the Meadville (Pa.) Company

The Meadville (Pa.) Telephone Co. reported 4,717 telephones in service at the end of 1937, only 2 per cent less than the peak of 4,814 reached in May, 1930. The net gain of 368 stations for the last year compares with a gain of 132 in 1936.

President Lloyd C. Wright, in his annual report to the company's stockholders for the past year, states that first mortgage bond interest requirements of $14,000 for 1937 were earned 3.4 times and that income for cumulative preferred stock dividends of $16,500 was 1.9 times requirements. These dividends represented 53.7 per cent of the income available, as compared with 50.2 per cent for 1936.

The operating revenues, after deducting uncollectibles, amounted to $194,161, an increase of 8.01 per cent over 1936. Operating expenses were $135,457, an increase of 13.59 per cent. Taxes assignable to operations amounted to $13,890, an increase of $2,939 over the preceding year.

Income available for fixed charges at the end of 1937 was $47,818, an increase of $7,309 over 1936. Interest and fixed charges amounted to $17,096, a decrease of $5,175 as compared with 1936. This was due principally to the refunding of 6 per cent bonds with an issue bearing 4 per cent interest.

After preferred stock dividends there was a balance of $14,222. Of this amount $9,000 was paid in dividends on common stock and the remainder, $5,222, added to surplus, bringing the surplus account, as of December 31, 1937, up to $114,942, an increase of $3,421 over 1936.

Gross additions to plant amounted to $107,442 and gross retirements, $55,402. The book value of telephone plant, including the property purchased from the Cussewago Telephone Co., was $922,466 as of December 31, 1937. The total assets of the company amounted to $1,129,326, as compared with $1,103,468 at the close of 1936.

The liabilities include: Total capital stock, $425,000; long-term debt, $375,000; depreciation reserve, $133,530, and unappropriated surplus, $114,942.

All of the 4,717 telephones served are company-owned. In addition to eight central offices, the Meadville company operates 17 private branch exchanges. There are 15,580 poles in its outside plant, with a total of 8,454 miles of wire; of this total 2,584 miles are underground.

The company employs 33 men and 59 women with a total payroll expenditure, in 1937, of $85,298. The daily average number of exchange messages in 1937 was 24,213, while outward toll messages totaled 198,212 for the year.

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Of 113 Nebraska Companies, 82 Had Loss Last Year

Eighty-two of the 113 Classes A to E telephone companies operating in Nebraska went into the red on their operations in 1937, according to computations made by Accountants Schnell and Howard of the Nebraska State Railway Commission from the reports of the companies filed with that body. Of these 113 companies, nine have no depreciation reserves and 35 have exhausted their surplus, now in the red.

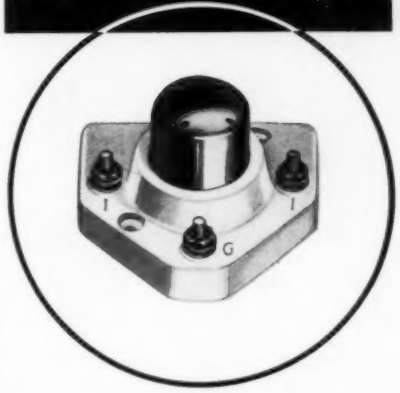
Twenty-seven companies paid dividends totaling $83,221 on a property investment of over eight and a half millions. The previous year's dividends paid were $110,000. These figures do not include the two largest companies, the Northwestern Bell Telephone Co. and the Lincoln Telephone & Telegraph Co., which paid their regular dividends.

Investment of the Lincoln company now totals nearly 16 millions, while that of the Northwestern Bell is close to 28 millions. Capital stock of the other companies, including the 30 Class F companies which have in excess of half a million, is $4,315,000. Notes and bonds outstanding of these companies total $1,396,459, with a total of $2,186,000 in depreciation reserves and $618,000 in surplus and undivided profits.

Total revenues of the Lincoln company were $2,817,429, of the Northwestern Bell $5,952,392 and of the other higher-classed companies $1,321,000 an increase of $335,000, of which the other companies contribute $12,000. Operating expenses of the latter group totaled $1,066,700, an increase of $40,000; of the Lincoln company $1,890,000, an increase of $34,000, and of the Northwestern Bell $4,162,000, an increase of $150,000. Total operating expenses were $7,120,000, compared with $6,896,000 the previous year.

Taxes totaling $1,162,000 were paid, the Lincoln company total of $274,175 representing a $53,000 increase, the Northwestern Bell total of $798,000 representing an increase of $78,000 and of the other companies $90,670, an increase of $7,000. Interest payments of

SANDS



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the entire group totaled $268,000, an increase of $16,000.

Company-owned business stations totaled 63,122 at the end of the year, compared with 64,221 twelve months before. Of these the Bell company serves 35,947, a decrease of nearly 1,000; the Lincoln company 17,321, a decrease of 200, and the others 9,754, an increase of over 100. Residence stations increased 1,030 to 117,036, of which the Lincoln company serves 35,208, an increase of 200, the Northwestern Bell 62,378, an increase of 1,165, and the others 19,450, a loss of 357. Rural stations decreased from 38,142 to 37,441.

The Lincoln company serves 12,837, a loss of 65, the Northwestern Bell 4,819, a loss of 171, and the others 19,785, a loss of 465. Total number of company-owned stations dropped from 218,369 to 217,499. The Northwestern Bell has 103,144, about the same as a year ago, the Lincoln company 65,366, a loss of less than 100, and the others 48,989, a loss of 844.

Switched stations totaled 20,152, an increase of 947. The Lincoln company switched 894, a decrease of 51, the Northwestern Bell 10,172, an increase of 1,291, and the others 9,086, a loss of 293.

Figures supplied for the 30 Class F companies show capital stocks of $541,598; revenues of $39,581; taxes, $1,251; total disbursements, $42,207; city stations, 650; rural stations, 1,021, a total of 1,671. Revenues dropped nearly $1,000, while disbursements increased $1,300. Station loss was 23.

CLASSES A TO E COMPANIES

Year	Business	City Residence	Rural	Total Company Owned	Switched Subscribers	Total All Subscribers
1930	66,626	138,774	65,808	271,208	24,697	295,905
1931	65,984	132,313	55,499	253,796	23,517	277,313
1932	60,492	116,251	42,886	219,629	21,317	240,946
1933	58,718	108,118	38,926	205,762	19,416	225,178
1934	60,977	111,350	36,697	209,024	19,790	228,814
1935	62,865	113,641	38,099	214,605	19,506	234,111
1936	64,221	116,006	38,142	218,369	19,205	237,574
1937	63,022	117,378	37,441	217,499	20,152	237,651

CLASS F COMPANIES

	City	Rural	Total Company Owned	Switched Subscribers	Total All Subscribers
1930	1,032	1,572	2,604	1,684	4,288
1931	906	1,258	2,164	1,563	3,727
1932	789	1,299	2,088	1,094	3,182
1933	737	1,061	1,798	856	2,654
1934	670	1,010	1,680	961	2,641
1935	805	1,015	1,820	1,078	2,898
1936	663	1,031	1,694	1,171	2,865
1937	650	1,021	1,671	1,160	2,831

ALL CLASSES COMPANIES

	Total Company Owned	Switched Subscribers	Total All Subscribers
1930	273,812	26,381	300,193
1931	255,960	25,080	281,040
1932	221,717	22,411	244,128
1933	207,560	20,272	227,832
1934	210,704	20,751	231,455
1935	216,425	20,584	237,009
1936	220,063	20,376	240,439
1937	219,170	21,312	240,482

Comparative statement of stations in service of 113 Nebraska telephone companies at December 31 of each year, for period 1930 to 1936 inclusive, issued by the Nebraska State Railway Commission.

Reorganization Plan of United Telephone Approved

A plan of reorganization for the United Telephone & Electric Co., submitted by the company's reorganization managers, and the declarations covering securities to be issued under the plan were approved August 1 by the Securities and Exchange Commission.

The commission's approval was given subject to the right to consider any amendments which might be proposed and providing that the proposed voting trust be modified so that on or before January 1, 1942, every holder of a voting trust certificate be given a reasonable time within which to withdraw his portion of the common stock.

The plan transfers assets to a new company to be organized under the laws of Kansas. These assets, having a book value of $12,847,478 on December 31, 1937, will be carried on the books of the new company as $8,329,352 as of the same date.

The new company will issue 4½ per cent sinking fund serial debentures in the principal amount of $1,297,003, plus the amount of interest on claims at 6 per cent from January 15, 1938, to the date which the court fixes for distribution of the debentures. It also will issue 601,633 shares of $10 par value common stock.

In addition, $51,084 of non-interest bearing certificates of indebtedness payable in two equal installments in 1939 and 1940 are to be issued in exchange for the liabilities in a like amount on account of thrift certificates and preferred stock installment payments.

The debentures will be issued to holders of the outstanding notes and accounts payable in an amount equal to the sum of the principal amount of such creditors' claims and all accrued and unpaid interest thereon except from May 15, 1936, to January 15, 1938. The new stock will be issued on the basis of 7.3 shares for each share of 7 per cent preferred and six shares for each share of 6 per cent preferred.

The plan provides that all new common stock shall be issued to five trustees under a voting trust which terminates on January 1, 1944, or by a vote of two-thirds of the stockholders in a referendum on January 1, 1942. On consummation of the plan, voting trust certificates representing the new stock will be distributed to holders of the stock now outstanding, subject to the modifications required by the commission.

Annual Report of the Central Electric & Telephone

The Central Electric & Telephone Co., of Sioux City, Iowa, reported for the year ended December 31, 1937, total operating revenues of $1,931,347, including those of its subsidiary, the Virginia Telephone & Telegraph Co. Deducting operating expenses and taxes in the total amount of $1,529,580 left net earnings from operations totaling $401,766. Other income brought total net earnings up to $417,235.

After interest deductions of $182,500, there was a net income of $234,734. After preferred stock dividends of $3 per share, $49,964 was transferred to surplus. This added to the earned surplus as of December 31, 1936, brought the earned surplus account up to $56,173. The balance in the capital surplus

account, as of December 31 last, was $2,826,049.

Max McGraw, president of the Central company, in his report to the stockholders, reminds them that since the company did not begin operating until February 29, 1936, a two-year earnings comparison is not included. He states, however, that 1937 revenues were approximately $93,000 greater and net earnings $23,000 greater before provision for depreciation and taxes than for 12 months of 1936.

State and local taxes other than income taxes for 1937, he states, were $166,439, an increase of approximately 14 per cent over 1936 for the same properties. During 1937 the company continued the payment of its $3 dividend on the $50 par value of preferred stock.

Last year the company spent $236,390 for maintenance. Gross expenditures for renewals and replacements amounted to $511,431, and net expenditures to $346,044. Additions and extensions, other than acquisitions of new properties, required an additional $44,765.

During 1937 the Central Electric & Telephone Co. acquired an interest in the Middle Western Telephone Co. and early this year the company assumed control of that group of companies which has as its subsidiaries the La Cross Telephone Corp. and the Middle States Telephone Co. of Illinois. The Warren (Ohio) Telephone Co. was an unconsolidated subsidiary of the Middle Western company. On December 31, 1937, the group recently acquired served a total of 23,040 stations.

As of December 31 last, the Central Electric & Telephone Co. (and its subsidiary) operated 45,917 telephones, as compared with 44,074 at the close of 1936.

The assets of the Central company are valued at $13,069,699; this includes a plant investment of $12,027,556.

*

The Central Electric & Telephone Co. has just made public its report for the six months' period ending June 30, 1938, with comparative figures for a similar period in 1937. Total gross earnings for the first half of this year were $839,233, compared with $800,552 in 1937. Operating expenses and taxes were $495,792, as compared with $472,454 in 1937.

Net earnings, before deducting income taxes, were $224,398, as compared with $203,791 in 1937. The balance for the six months' period of this year was $133,191; in 1937 it was $112,716. After income taxes there was a surplus net income of $111,666, as compared with $100,582 for the first half of last year. The semi-annual dividend requirement on preferred stock was $92,385, the same as last year.

The six months' report of the Central Electric and subsidiary companies showed total gross earnings of $1,387,214 for the period June 30, 1938. Operating expenses and taxes were $844,995. After a provision of $207,674 for depreciation, deductions of $177,047 for interest and miscellaneous deductions, and a provision of $30,775 for income taxes, the surplus net income for the six months was $126,721.

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Valuation of Nebraska Companies for Taxation

In this year's franchise ratings of the Nebraska State Board of Equalization 115 telephone companies are listed, ranging from as low as $100 for a small-town company to a million dollars for the Northwestern Bell Telephone Co. They will pay taxes on these values, but in rate cases going concern values are not considered.

Other franchise values as fixed by the board include: Lincoln Telephone & Telegraph Co., $175,000; Nebraska Continental Telephone Co., Columbus, $32,000; Platte Valley Telephone Corp., Scottsbluff, $27,500; American Telephone & Telegraph Co., $60,000; Arlington, $1,000; Blair, $3,000; Cedar County Farmers, Hartington, $1,000; Cambridge, $1,800; Central Nebraska, Grant, $3,100; Citizens of Blair, $2,500;

Central Electric & Telephone Co., Sioux City, $22,000; Cozad, $1,000; Crete, $3,500; Cuming County, Wisner, $2,400; Farmers Independent, Red Cloud; Farmers of Dodge County, North Bend, $1,500; Glenwood, Blue Hill, $2,000; Farmers of Hamilton County, Aurora, $4,200; Nebraska Central, Gibbon, $3,000; Northeastern, Walthill, $1,000; Pawnee at Pawnee City, $2,100; Public of Blair, $2,500; Skeedee at St. Edwards, $1,000; Southeast Nebraska, Falls City, $5,000; Stanton, $1,200.

▼ ▼

Southwestern Bell Reports Decline in Net for Six Months

The Southwestern Bell Telephone Co. reports a net income of $8,565,290 for the six months ended June 30, as compared to $9,162,852 in the like period last year. While total revenues were $43,592,338 as against $42,756,252 in the corresponding period in 1937, total expenses including taxes increased to $33,947,198 from $32,610,291 and interest of $1,079,850 compared with $983,110 in 1937. A sum of $8,547,492 was paid in dividends as against $8,114,992 in the first six months of last year.

Net telephone earnings for the first half of this year were at the rate of 5.41 per cent on the cost of the plant.

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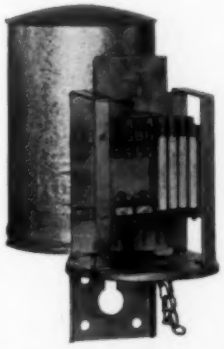

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Theory of Modern Television (Ctd.)

It is surprising fact that the Nipkow disk was invented by P. Nipkow in Germany in 1884. Fig. 4 illustrates schematically the general features of a Nipkow disk as used in connection with a television transmitter.

The scene or object to be televised is focused by means of a lens system on the disk. The width of the scene focused on the disk should be equal to the radial distance between

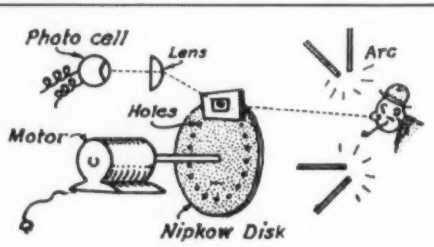


FIG. 4. THE NIPKOW DISK FOR TELEVISION SCANNING.

the first and last holes, while the length is determined by the distance between adjacent holes.

When the disk is rotated, each elemental part of the scene will be "scanned" by one of the holes in the disk. Thus, when any hole is in a given position so that light passes through it, the amount of light reaching the photo-cell at this particular instant will be proportional to the light reflected from that particular part of the scene. Typical disks have from 48 to 72 holes. Inasmuch as the disk is fairly large and the scene small, each hole travels approximately horizontally across the scene being scanned.

The number of elements into which the scene will be resolved is dependent on the number of holes in the spiral, the size of the hole, and the size of the view capable of being televised.

Receiving End of Nipkow System

It will be seen that the complete scene will be scanned once for each revolution of the disk. If an identical disk, behind which is a glow lamp connected to the transmitting photo-cell, be revolved at the same speed as the sending

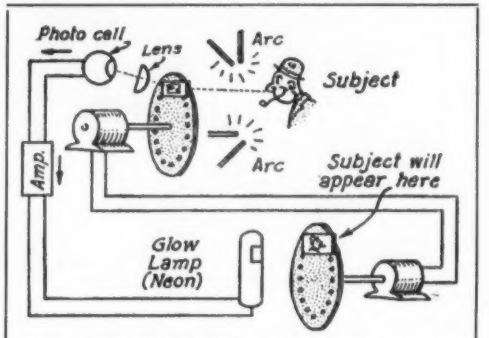


FIG. 5. COMPLETE SYSTEM EMPLOYING NIPKOW DISK PRINCIPLE.

disk and with respective holes "in phase"—that is, *scanning the same scene position at a given instant*—then an observer viewing the front of the receiving disk would see thereon a reproduced image of the distant scene.

Fig. 5 illustrates schematically a complete system employing the Nipkow disk principle.

Improved Scanning Arrangement

The system described in the foregoing made use of a light source on the same side of the disk as the scene being televised. This scheme is not nearly as good as the one in which an intense light source (such as an arc light) is

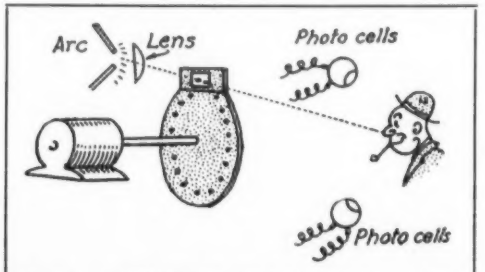
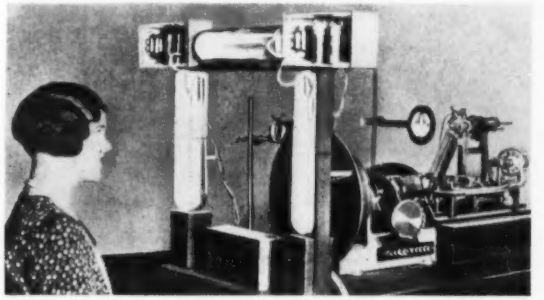


FIG. 6. ALTERNATIVE TYPE OF NIPKOW DISK SYSTEM.

focused by means of a lens system so as to pass through the tiny holes in the disk and to fall on an elemental part of the scene. When the disk is revolved, a single brilliant spot of light scans the subject and is reflected into photo-cells placed close to the scene.

This system offers the advantage of a much greater amount of reflected light and enables placing the photo-cells



(Courtesy of Bell Laboratories Record)

FIG. 7. EARLY TYPE OF MECHANICAL SCANNER

much closer to the scene, thus giving a better operating margin.

Practically all of the successful systems which utilize the Nipkow disk make use of this later type of system. Fig. 6 illustrates the principal features of this system. Some of the more successful systems employing this latter arrangement make use of small lenses instead of plain holes in the disk, thus giving a more effective passage of light through the disk.

The system of Fig. 6 was proposed by A. Ekstrom in 1910 and was considered at the time a substantial improvement in scanning methods. It was really the first practical solution of the television problem. Using this principle, excellent public demonstration of television was given as early as 1923.

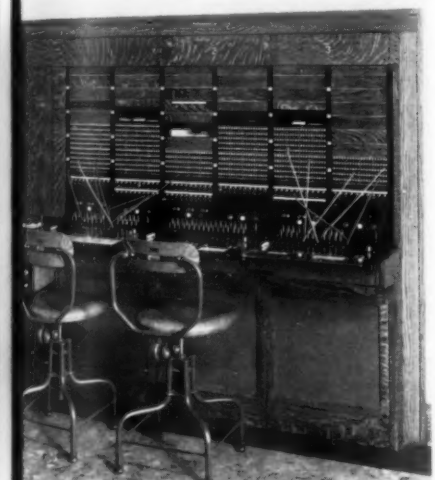
Due to the fact that a rapidly-moving spot of light passes over the scene, it is called the "flying spot." Fig. 7 shows a mechanical scanner television transmitter developed some time ago by the Bell Telephone Laboratories.

Modern Exchange With Underground Plant

By P. WINEMILLER
Sales Engineer, Stromberg-Carlson Telephone Mfg. Co.

GROWTH and development of Eureka (Ill.) Telephone Co. which recently cut into service new central energy central office equipment. Provision was made for common battery service on rural lines. Eureka's outside plant is entirely underground

A STORY of enterprise, determined effort and foresight is revealed in reviewing the history of the Eureka Telephone Co., now operating some 700 stations in the city of Eureka, Ill., and rural territory adjacent thereto. Located 20 miles east of Peoria on U. S. highway 24 is this county seat of Woodford county with a population of about 2,000. From Eureka college, established in this city 55 years ago, graduates have gone out into the four corners of the world. This liberal arts college, with an average enrollment of 250, is a coeducational school.



Stromberg-Carlson "super-service" switchboard installed for the Eureka Telephone Co., at Eureka, Ill.

Like many Illinois and Indiana towns similar in size and other characteristics, Eureka has a number of small and medium-sized industries but no large ones. Its location with respect to the larger industrial operations of Peoria and East Peoria naturally fits it as the home of many a Peoria worker and his family.

More than 25 years ago the property now known as the Eureka Telephone Co. came into the possession of M. F. Melick, father of the present owners, C. F. Melick and W. M. Melick. He was at that time president of the West Liberty (Iowa) Telephone Co.

C. F. Melick left the old home at West Liberty, Iowa, January 1, 1913, to take charge of the Eureka, Ill., plant which his father had just acquired. He was joined by his brother, W. M. Melick, in March, 1914.

In passing, it is interesting to note that in 1921 the West Liberty Telephone Co. under management of the third son, Henry B. Melick, was cut over from magneto to common battery operation. Incidental to this program were the erection of a modern exchange building and the installation of a three-position Stromberg-Carlson multiple board.

During the depression years the Melick brothers carried on in Eureka without losing subscribers, or reducing rates, by continuing to serve for months at a time subscribers whom they knew to be perfectly reliable but who were temporarily financially embarrassed. As a result of this experience their abiding faith in the inherent honesty of most men was strengthened.

As early as 1925 plans were formulated for a full underground cable layout and today there is not a foot of aerial cable or open wire inside the corporate limits of Eureka.

Realizing that magneto service was not adequate for the communication needs of this progressive community, these forward-looking telephone men several years ago began making preliminary arrangements for the introduction of common battery service by installing special battery feed coils, pro-

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GRAY TELEPHONE PAY STATIONS

duced for the trade at that time under the name of Rodman coils. The service having proven very popular, an improved type of coil and mounting was later adopted.

Through the introduction of these coils and the acquainting of the subscribers with the value of common battery service, it was not a difficult task to sell the community on the idea of full common battery with modern, service-bettering features.

Early in 1937 an investigation of new central office equipment was begun in order that plans for the complete modernization of the Eureka exchange might be carried out. An order was finally placed with the Stromberg-Carlson company for central energy equipment.

The equipment installed on the ground floor in the new exchange building at Eureka consists of a three-position Stromberg-Carlson "super-service" board and associated apparatus, including a combined main distributing frame and line relay rack, a power board, and wire chief's test unit. In the basement was installed the duplicate five-frequency harmonic converter, with complete testing equipment, tungar rectifier and TVR charge-control equipment and the storage battery.

Although Eureka is not a toll center, it will be noted from the photograph of the wire-chief's test panel and the power board that toll test-jack equipment has been installed to adequately serve the toll-line testing needs of the exchange. All toll and rural line terminating equipment is of lamp signal type, with the lamp arranged to repeat the code signal when stations on the same line ring each other.

The rural line equipment is so designed that any such line can be modified so as to provide common battery service by making a few simple changes at the line relay rack. Some of the Eureka rural subscribers are already using this service with great satisfaction.

Incorporated in the Eureka installation are multiple line lamps, machine ringing with instantaneous trip of the ringing, flashing recall and super-service (keyless) selection of the party-line station. With this latter arrangement all party-line keys individual to the cord circuit are thus eliminated.

Five harmonic frequencies are installed so as to make adequate provision for 10-party selective machine-ringing service on the rural circuits converted to common battery operation.

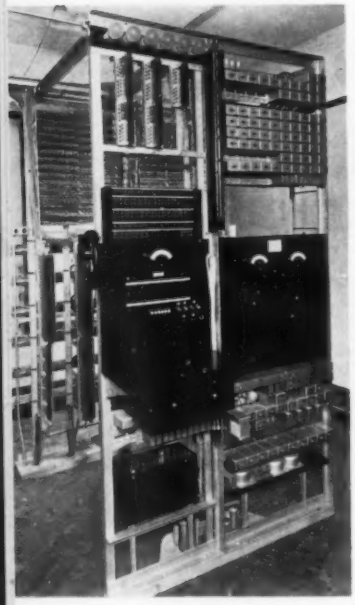
All cord circuits are full universal so that any operator can answer and complete any type of call. One hundred per cent flexibility is thereby obtained for all operators.

In connection with the power equipment all circuits are switched on relay contacts instead of through knife-blade switches. In the event of commercial power failure all power circuits are automatically switched to relief units but are automatically returned to regularly-assigned units immediately upon resumption of service on the commercial circuits.

It is a hobby of the owners of this exchange to always have the building and all equipment in "spick and span" condition, ready for dress inspection. As a consequence, it has acquired a reputation for neatness and cleanliness.

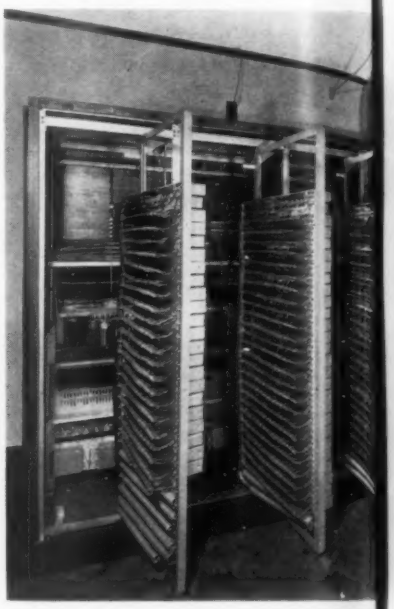
Shortly after cutting into service its new equipment the management held a reception, or "open house," for friends and subscribers so that all who wanted to do so might acquaint themselves with the new apparatus. About 200 visitors registered while a number of others passed through and examined the plant without attending to that formality. Messages of congratulations were received from many other telephone companies while floral greetings came in from many sources.

In June when a district meeting of the Illinois Telephone Association was held at Eureka, all of the visiting telephone people took advantage of the opportunity to inspect the plant and expressed their admiration for the modern, efficient equipment serving this enterprising community. Approximately 125 persons were present.



(Left) Wire chief's test panel and power board recently installed in Eureka telephone exchange.

New exchange building of the Eureka Telephone Co.



(Right) Rear view of "super-service" switchboard now serving the Eureka exchange.

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New Hampshire's Annual Meeting Next Month

The annual meeting of the Telephone Association of New Hampshire will be held at Hotel Ashworth, Hampton Beach, September 7 and 8. Mrs. Bernice M. Rines, Laconia, is secretary of the organization.

The program will be of interest to managers, plant men, traffic and commercial employes. State and federal activities relating to the telephone business will be discussed and solutions to individual problems will be suggested by specialists in the different branches of the industry.

"Streamlined" Supply Service

By R. H. BURFEIND
American Automatic Electric Sales Company

SPEEDY SHIPMENTS of supplies and construction materials to telephone companies are made possible by constant attention from time order is received until material is dispatched — only a few hours later

SO MANY things have been done recently to speed up shipments of supplies and construction materials to telephone companies that the fact deserves more than passing recognition. It might be interesting to the telephone manager to know something of the processes by which his order is translated into shipment within a few brief hours.

R. H. BURFEIND, American Automatic Electric Sales Company, Chicago, tells of the "streamlined" handling of orders by manufacturers and suppliers to expedite their immediate delivery to telephone companies.

The best way, it seems to me, to acquaint the telephone manager with "streamlined" supply service is to conduct him on an imaginary tour of our organization so that he may follow the progress of an order from the time it is received until it is on its way, and observe what operations are involved and how each is performed. Let's go!

The mail desk is our first stop. As each mail delivery arrives, the mail clerk sets to work to open each piece, stamp it with the date and hour and start it on its way to the department concerned. Fifteen-minute local mail service is the rule, so orders are never permitted to loiter at any point in the office.

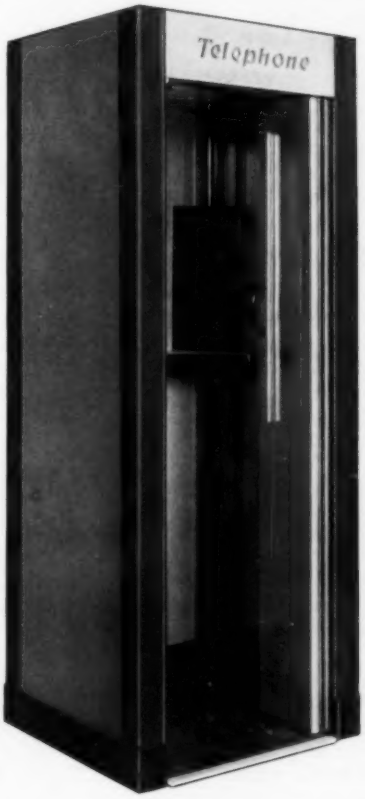
The mail boy next delivers the order to the division sales manager of the area in which the customer is located. These division sales managers are experienced telephone men, who know customer problems from long years of intimate contact with them. Their job is to analyze every order. From their thorough familiarity with each customer's needs and preferences, they are able to edit each order to make certain that it will be filled precisely as the customer intends. These managers have an understanding of customer preferences which is second in importance only to their thorough knowledge of the telephone business.

The next few minutes sees the order in the hands of the order-typing department, where the edited instructions are entered on order forms by means of a battery of "fanfold" machines. Here again time is saved, for in this one operation copies of the order are made for every department interested—accounting, billing, stockroom, shipping, sales, etc., with, of course, the proper copies for the customer's use.

Inasmuch as during this imaginary visit we are concerned primarily with quick shipment, we will follow the copy that goes to the stockroom. An alert stockroom attendant—a man who, by the way, knows every piece of pole line hardware or construction material by its first name—takes the order and goes from section to section and bin to bin with amazing speed, assembling every item called for on the order.

Then, as an added precaution, a checker goes over the entire list to see that every item is "present and accounted for." It is not long now before the material order is on a stockroom truck, headed for the shipping room where master packers go to work on

go modern with
STEEL
it serves and survives



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A New "HIGH" in REVENUE

A new booth at a low cost making available to telephone companies a high revenue never before possible. Write for descriptive circular and information.

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J. H. BUNNELL & COMPANY
215 Fulton Street, New York, N. Y.

it. These men pack with such skill that maximum protection is achieved with a minimum of padding and crating weight.

The entire bill of materials, accurately filled, carefully checked, expertly packed and labelled, is then wheeled out to the shipping platform, where a truck is waiting to take it to the freight depot and start it on the way to the customer. The elapsed time —from the moment the order is received until the material is dispatched —is only a few brief hours.

In the supply business, it is not sufficient for the supplier merely to "deliver the goods" in his own sweet time. He must deliver the goods as quickly as it is humanly possible, and he must see to it that they arrive at their destination in perfect condition and without a single item missing.

It is human nature for buyers to put off ordering until the need actually arises. This means that when they order, they usually need the goods at once. It is up to the supply company to make up that lost time. To do that, a supplier must not only have his business highly organized, but he must also have a staff of competent, experienced men and women able to give each order intelligent thought and swift action.

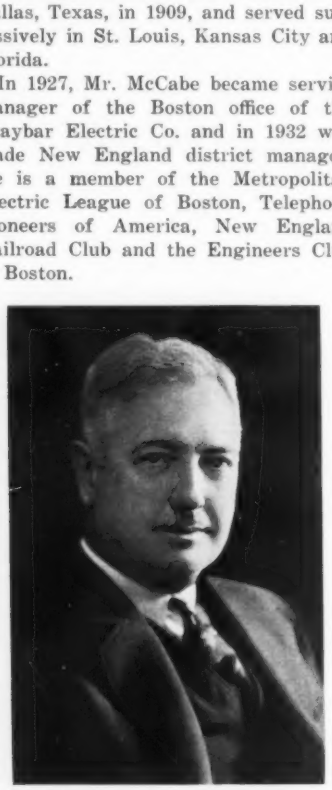
The Manufacturers' Department

Sales Manager for Indiana Steel & Wire Co.

R. J. McCabe has been appointed manager of sales, electrical materials, for the Indiana Steel & Wire Co., Muncie, Ind., according to an announcement by Fred M. Crapo, vice-president and general manager.

Mr. McCabe becomes associated with the Indiana Steel & Wire Co. after nearly 30 years' service with the Western Electric Co. and Graybar Electric Co. He joined the Western Electric at Dallas, Texas, in 1909, and served successively in St. Louis, Kansas City and Florida.

In 1927, Mr. McCabe became service manager of the Boston office of the Graybar Electric Co. and in 1932 was made New England district manager. He is a member of the Metropolitan Electric League of Boston, Telephone Pioneers of America, New England Railroad Club and the Engineers Club of Boston.



© Bachrach

R. J. McCABE will direct the sale of Crapo galvanized telephone wire, steel strand, etc., for the Indiana Steel & Wire Co.

In his new connection, Mr. McCabe will direct the sale of Crapo galvanized telephone wire, steel strand and other products, to the telephone field.

▼ ▼

Leich Electric Offers New Repeating Coil

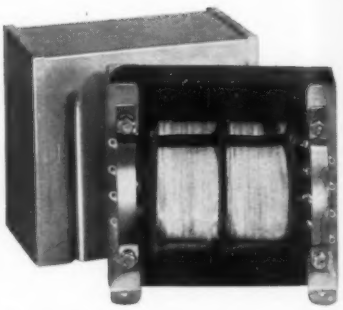
A new high-efficiency repeating coil for the interconnection of grounded and metallic lines and for phantom circuit work has been announced by Leich Electric Co., Genoa Ill. The new coil is a talk-through, ring-through type with a one to one impedance ratio. It is made with a closed type core of silicon steel laminations and balanced parallel windings and is said to have an excellent response curve up to 3,500 cycles.

In offering the new coil, A. C. Reid, general manager and chief engineer of the Leich company, says: "The increasing use of repeating coils to avoid inductive interference caused by rural electrification created the need for a specifically-designed, general-purpose, talk-through, ring-through coil which could be easily mounted on a pole.

"Older type coils, which were primarily intended for installation in switchboards or on central office racks, were usually mounted on a large, wooden base. The new Leich coil, which makes use of the latest materials in its design and construction, is more compact and has a nearly cubical shape. This means that two of them can easily be installed in one of the modern, small-size protected coil housings to make a neat and inexpensive pole installation.

While the new Leich No. 20 coil will probably find its greatest use in the interconnection of grounded and metallic circuits, it can be equally well employed for phantom circuits. The standard coil will cover most of the normal requirements of this type; but where it is desired to match the impedance of the central office equipment, special coils wound to the proper ratios can be furnished."

Diagrams showing the terminal connections for grounded to metallic circuit connections, or for phantom circuits, may be obtained by writing Leich Sales Corp., 222 West Adams Street, Chicago.



The new Leich No. 20 repeating coil for interconnection of grounded and metallic circuits and for phantom circuit use.

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New Burroughs Calculator for Simplifying Calculating

An electric duplex calculator, equipped with direct subtraction, has recently been developed by the Burroughs Adding Machine Co., to do a complete calculating job with but a single handling of the figures. Computing or checking invoices, payroll, inventories, costs, requisitions, sales analyses, statistics, prorating, bank account analyses, and general calculating can now be greatly speeded and simplified.

The Burroughs duplex calculator has been designed to provide the results of individual calculations and to accumulate the grand total without the separate operation of recapping, thus avoiding the chances of errors which frequently occur when figures must be "cleared" from the machine and then relisted to obtain a grand total.

An outstanding advantage of the new calculator, the company states, is that the result of a single calculation, appearing in the lower of two sets of dials, can be verified for accuracy before being transferred to the upper set

Burroughs Adding Machine Co. has developed an electric duplex calculator, equipped with a subtract key, for simplifying calculating.

of dials, which provides the grand total or net result. If the amount is incorrect, it can be cleared from the lower dials without affecting the figures already accumulated in the upper dials.

The electric duplex calculator is equipped with a subtract key by means of which the amount in the lower dials is quickly subtracted from an amount in the upper dials without the use of complementary figures. Thus, any amount in the lower dials can either be added to or subtracted from the amount in the upper accumulating register by merely touching the plus bar or minus key.

Where calculations result in fractions of cents, the machine will either give or take the half-cent, as desired, or accumulate the fractions in the normal way.

As will be seen from the accompanying illustration, the Burroughs duplex is enclosed in a neat, crystal-panel case, trimmed with black enamel. The slope of the keyboard and position of the dials reduce eyestrain and permit easier operation. Fast and uniform key-action is obtained through a quiet motor which runs only when keys are depressed, thus saving unnecessary wear and expense. Partial registration of key values and the simultaneous depression of two keys in the same column are impossible.

The electric duplex calculators with direct subtraction are available either in 10- or 14-column capacities, and are backed by Burroughs standard guaranty and world-wide service.

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Neir with National Construction & Engineering

Announcement has recently been made by P. W. Conrad, president of National Construction & Engineering Company of Chicago, Ill., of the appointment of E. R. Neir as vice-president, in which position he will also have direct charge of all installation activities.

This organization, an associate of Automatic Electric Company specializes in telephone plant engineering, construction and installation, and also is an important dealer in rebuilt telephone apparatus and instruments. It is enlarging its personnel to care for its expanding activities in both fields.

Mr. Neir is well known throughout the Independent telephone field and particularly to those companies which have installed Automatic Electric equipment, since for many years he was superintendent of installation and operation for Automatic Electric Company. In this position, he was in charge of installation work for a number of the largest installations of this equipment made in this country.

He has acted in various executive capacities for Automatic Electric Company, having been factory manager and general superintendent of equipment, and more recently has been a member of the executive staff acting on special assignments. His long background of varied experience in the telephone field makes him exceptionally well-fitted for his new position.

C. J. Diehl, formerly superintendent of installation and service for National Construction & Engineering Company, has been made resident engineer for Automatic Electric Sales Company, Limited, at Sao Paulo, Brazil, and has already sailed to assume his duties there. Mr. Diehl has had long experience in varied types of telephone engineering and installation work, previously with Automatic Electric Company, and more recently with the National company.

▼ ▼

Airplane to Ground Telephone for Clipper Plane

The first airplane-to-land telephone service for passengers' use will be installed on the new Pan-American clipper designed for Atlantic Ocean flying, to be put in service in the fall. Calls can be made to any telephone in the country while the plane is in the air.

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For a long life of dependable low-cost service rely on Hemingray Pin-Type Glass insulators.

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New Masterbuilt Switchboard For Covington, Va.

By A. W. SCHELL
Representative, Kellogg Switchboard & Supply Co.

THE CLIFTON Forge-Waynesboro Telephone Co., Clifton, Va., recently installed a Kellogg Masterbuilt switchboard in its Covington exchange. Covington is now provided with fast, modern telephone service.

The central office equipment consists of a four-position, 12-1600 Masterbuilt switchboard which was purchased from the Kellogg Switchboard & Supply Co. of Chicago. The switchboard provides five fundamentals of good telephone service: (1) Quick answer from the operator, (2) a fast connection, (3) a satisfactory, uninterrupted conversation, (4) a prompt recall so another call can be made, and (5) a rapid disconnect.

The switchboard has four positions with an ultimate capacity of 1,200 lines multipled on a three-panel basis. At present there are 1,000 local lines equipped, 40 pay-station lines, 40 toll lines and 60 rural lines.

Covington, with a population of 12,000, is located in the western part of Virginia on the route of the Chesapeake & Ohio Railway. The Jackson River, principal headwater of the James, flows through the town. Its principal industries are West Virginia Pulp & Paper Co., employing 1,700 people and producing many types of book and magazine paper, craft paper and fibre board; Industrial Rayon Corp., employing 1,200 people and producing rayon yarn; and the Covington Weaving Co., employing 300 people and producing woven rayon cloth.

The Clifton Forge-Waynesboro Telephone Co. in the past ten years has doubled its number of subscribers and more than doubled its facilities and the efficiency of its service. Covington's telephone system is not only modern today but it is designed for expansion in the years to come. Provision is made for an increased number of subscribers, for changes in local, rural, or toll growth and for the many other changing conditions which are peculiar to the telephone business.

All in all, the citizens have ample grounds for being proud of the fine work the Clifton Forge-Waynesboro Telephone Co. has done. Needless to say, these improved telephone facilities will do credit to the city and are a long step forward in its march of progress.

Four-position, 12-1600 Kellogg Masterbuilt switchboard similar to the one recently installed at Covington, Va.

Obituaries of Telephone Men

HERMAN F. EHINGER, secretary and general manager of the Citizens Telephone Co., Decatur, Ind., and a director of the Indiana Telephone Association was fatally injured in an automobile-truck collision which occurred Tuesday afternoon, August 16, five miles south of Anderson. Mr. Ehinger was 44 years of age. Another occupant of the car who was fatally injured was Hugh Hite, Indiana tax inspector for the FHA, age 56, of Detroit, Mich.

Mr. Ehinger's son, James, 18 years old, who was driving the car, suffered shock and minor injuries, while his wife, Lea, 41 years old, suffered from head injuries and shock, but x-rays revealed no fractures.

James told officials that he was driving through a rainstorm when the front wheel of his car caught in a crevice in the pavement, causing it to skid into the path of a Western Union Telegraph Co. truck.

Messrs. Ehinger and Hite were sleeping in the back seat of the car when the accident occurred. The telephone man was killed instantly, while the FHA man ploye died an hour later without regaining consciousness. The party was returning to Decatur from a business trip to Indianapolis.

Although still a young man, Mr. Ehinger had been in the telephone business 26 years. Born in Decatur, the son of a prominent merchant, Mr. Ehinger was educated in the St. Joseph Catholic School of Decatur and was graduated from the Fort Wayne Business College.

In 1912 he entered the employ of the Citizens Telephone Co., of Decatur, as bookkeeper and collector, becoming general manager and secretary in 1918. Under his leadership the company became recognized as one of the outstanding Independent telephone companies of Indiana.

Mr. Ehinger had all but witnessed the realization of his dreams, the complete modernization of the company's physical plant. Nearing completion is the construction of an underground plant in Decatur, Monroe and Berne.

He was a leader in church and civic activities, a member of the Knights of Columbus, the B. P. O. E. and the Fort Wayne Country Club. He was a member and secretary of the Decatur Library Board. In 1916 he served as chairman of the Decatur Centennial.

Surviving Mr. Ehinger are his widow; his mother, Mrs. Carrie Ehinger; a brother Richard, advertising manager of the Decatur Daily Democrat Co.; three sisters, Mrs. Lawrence Kleinhenz and Jeanette of Decatur, and Sister M. Antoinette (Ethel Ehinger) of Evanston, Ill.; and two sons, James who figured in the accident, and Charles, both of Decatur.

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DEAN DALTON CLARK, first assistant to the president of the Mountain States Telephone & Telegraph Co. and one of the most widely-known business executives in the Rocky Mountain region, died in Mercy hospital Denver, Colo., August 8, following a surgical operation, at the age of 58 years.

Mr. Clark was born in Leadville, Colo., and was brought to Denver by his parents when a small boy. He obtained his first job in 1899. After serving for five years as a clerk for the Woodmen of the World, he became, in 1905, a special agent for the old Colorado Telephone Co.

Later he was transferred to special agent work in the Trinidad (Colo.) district and for a short time served as an exchange manager for the telephone company in Raton, N. M.

With the merger in 1911 of several telephone companies into the Tri-State Telephone Co., Mr. Clark became the head of the new company's public relations office in El Paso, Texas. The next year he became commercial manager for El Paso, New Mexico and Arizona.

In 1920 he returned to Denver as commercial manager for the entire Mountain States company, a position he held until 1934, when he was made first assistant to the president of the company.

For the last 18 years, Mr. Clark had been interested in scores of civic undertakings. He was a Mason and a Shriner, was a member of the Denver Athletic club, the Izaak Walton league and many other organizations.

POLES

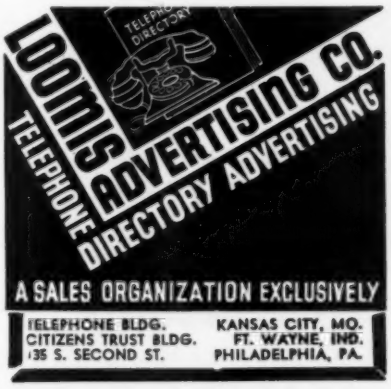
B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Fentrex Butt Treated or Plain.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants: Beaumont and Texarkana, Texas.

MacGillis & Gibbs Company, Milwaukee, Wis.—Northern White and Western Red Cedar Poles. Plain or butt-treated. Immediate quotations on request.

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.



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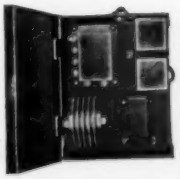
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